

Amendment to the Claims:

IN THE CLAIMS

1. (Amended): A method of producing nitrogen trifluoride, comprising:
providing a fluorine-containing feed stream;
contacting the fluorine-containing feed stream with liquid ammonium acid fluoride in a series of reactors, wherein each successive reactor contains liquid ammonium acid fluoride having a lower bulk melt acidity value than that of the immediately preceding reactor reaction zone for a time and under conditions sufficient to produce nitrogen trifluoride, decreasing the effective melt acidity value of the liquid ammonium acid fluoride during said contacting step; and
removing a reaction product stream comprising nitrogen trifluoride from the last reactor in said series reaction zone.
2. (Canceled).
3. (Amended): A method according to Claim 1, wherein said bulk melt acidity value of the first reactor in said series is decreasing step comprises decreasing the effective melt acidity value of the liquid ammonium acid fluoride from a value above the optimum value resulting in the highest nitrogen trifluoride yield and said bulk melt acidity value of the last reactor in said series is at reaction zone temperature and pressure to approximately the optimum value.
4. (Original): A method according to Claim 1, wherein the fluorine-containing feed stream comprises elemental fluorine and hydrogen fluoride.
5. (Original): A method according to Claim 1, wherein the ammonium acid fluoride has an acid-base stoichiometry of $\text{NH}_4\text{M}_y\text{F}_z(\text{HF})_x$, wherein M is a metal selected from the group consisting of Group IA through VA, Group IB through VIIB and Group VIII of the Periodic Table of Elements or mixtures thereof; y is 0-12; z is 1-12; and x is the melt acidity value.

6. (Original): A method according to Claim 1, wherein the ammonium acid fluoride has an acid-base stoichiometry of $\text{NH}_4\text{F}(\text{HF})_x$, wherein x is the melt acidity value.
7. (Amended): A method of producing nitrogen trifluoride, comprising:
providing a gaseous mixture of elemental fluorine and hydrogen fluoride;
feeding the gaseous mixture into a reaction zone containing a bulk ammonium acid fluoride;
contacting the gaseous mixture with the bulk liquid ammonium acid fluoride for a time and under conditions sufficient to produce nitrogen trifluoride, ~~wherein the initial effective melt acidity value of the ammonium acid fluoride is greater than the melt acidity value of the bulk liquid ammonium acid fluoride;~~ and
removing a reaction product stream comprising nitrogen trifluoride from the reaction zone.
8. (Amended): A method according to Claim 7, wherein in an area of said reaction zone where said gaseous mixture initially contacts said bulk liquid ammonium acid fluoride, the ~~initial~~ effective melt acidity value is at least about 0.05 greater than the melt acidity value of the bulk liquid ammonium acid fluoride in the rest of the reaction zone.
9. (Original): A method according to Claim 7, wherein the bulk liquid ammonium acid fluoride melt acidity value is less than about 1.8.
10. (Original): A method according to Claim 7, wherein the bulk liquid ammonium acid fluoride melt acidity value is less than about 1.6.
11. (Original): A method according to Claim 7, wherein the bulk liquid ammonium acid fluoride melt acidity value is less than about 1.5.
12. (Original): A method according to Claim 7, wherein the initial partial pressure of hydrogen fluoride in the gaseous mixture is at least about 15 kPa at the operating temperature and pressure of the reaction zone.

13. (Original): A method according to Claim 7, wherein the initial partial pressure of hydrogen fluoride in the gaseous mixture is at least about 25 kPa at the operating temperature and pressure of the reaction zone.

14. (Original): A method according to Claim 7, wherein the initial partial pressure of hydrogen fluoride in the gaseous mixture is at least about 40 kPa at the operating temperature and pressure of the reaction zone.

15. (Original): A method according to Claim 7, wherein the operating temperature of the reaction zone is about 120 to about 150°C.

16. (Original): A method according to Claim 7, wherein the operating pressure of the reaction zone is about 80 to about 200 kPa.

17. (Original): A method according to Claim 7, wherein said contacting step occurs in a stirred tank reactor.

18. (Amended): A method according to Claim 7, wherein said ~~of producing nitrogen trifluoride, comprising:~~

~~providing a gaseous mixture of elemental fluorine and hydrogen fluoride;~~
~~feeding the gaseous mixture into a reaction zone containing a bulk ammonium acid fluoride;~~
~~contacting the gaseous mixture with the bulk liquid ammonium acid fluoride having a bulk melt acidity value of less than about 2.0 for a time and under conditions sufficient to produce nitrogen trifluoride, wherein the initial effective melt acidity value is greater than the melt acidity value of the bulk liquid ammonium acid fluoride, and further wherein the initial partial pressure of hydrogen fluoride in the gaseous mixture is at least about 15 kPa at the operating temperature and pressure of the reaction zone;~~
~~removing a reaction product stream from the reaction zone, the reaction product stream comprising nitrogen trifluoride and entrained liquid ammonium acid fluoride; and said method further comprises the steps of:~~

introducing the reaction product stream into a regeneration zone, wherein the operating pressure of the regeneration zone is lower than the operating pressure of the reaction zone such that gaseous hydrogen fluoride is released from the entrained liquid ammonium acid fluoride; removing a regeneration product stream from the regeneration zone, the regeneration product stream comprising nitrogen trifluoride and hydrogen fluoride; introducing the regeneration product stream into a separation zone to separate hydrogen fluoride from nitrogen trifluoride; recycling liquid ammonium acid fluoride from the regeneration zone to the reaction zone; and recycling at least a portion of the hydrogen fluoride separated in the separation zone for use in the gaseous mixture of elemental fluorine and hydrogen fluoride.

19. (Canceled).

20. (Canceled).

21. (Canceled).

22. (Canceled).

23. (Canceled).

24. (Canceled).

25. (Canceled).

26. (Canceled).

27. (Original): A method according to Claim 18, wherein the reaction zone and the regeneration zone are located within separate stirred tank reactors.

28. (Original): A method according to Claim 18, wherein the operating pressure of the reaction zone is at least about 50 kPa higher than the operating pressure of the regeneration zone.
29. (Original): A method according to Claim 18, wherein the operating pressure of the regeneration zone is about 5 to about 20 kPa.
30. (Original): A method according to Claim 18, wherein the regeneration zone is located at an elevation at least about 6 meters higher than the elevation of the reaction zone.
31. (Original): A method according to Claim 18, wherein said step of recycling liquid ammonium acid fluoride from the regeneration zone to the reaction zone comprises:
- passing liquid ammonium acid fluoride from the regeneration zone to a gas-liquid separation tank in order to separate a gas phase from the liquid ammonium acid fluoride;
 - combining the gas phase produced in the gas-liquid separation tank with the regeneration product stream; and
 - passing liquid ammonium acid fluoride from the separation tank to the reaction zone.
32. (Original): A method according to Claim 18, wherein the recycled liquid ammonium acid fluoride from the regeneration zone is mixed with the gaseous mixture of elemental fluorine and hydrogen fluoride prior to entry into the reaction zone.
33. (Original): A method according to Claim 18, wherein the flow rate of the recycled liquid ammonium acid fluoride entering the reaction zone is at least about 1000 times the stoichiometric flow rate.
34. (Original): A method according to Claim 33, wherein the flow rate of the recycled liquid ammonium acid fluoride entering the reaction zone is at least about 2000 times the stoichiometric flow rate.

35. (Original): A method according to Claim 18, further comprising:

reacting ammonia with hydrogen fluoride in a second reaction zone under conditions sufficient to produce ammonium acid fluoride;

removing a liquid ammonium acid fluoride product stream from the second reaction zone; and

introducing the ammonium acid fluoride product stream into the regeneration zone.

36. (Original): A method according to Claim 35, further comprising:

contacting the liquid ammonium acid fluoride product stream from the second reaction zone with the regeneration product stream from the regeneration zone in order to remove entrained ammonium acid fluoride from the regeneration product stream.

37. (Original): A method according to claim 36, wherein said step of contacting the ammonium acid fluoride product stream from the second reaction zone with the regeneration product stream from the regeneration zone comprises contacting the ammonium acid fluoride product stream and the regeneration product stream in a demister.

38. (Original): A method according to Claim 35, wherein at least a portion of the hydrogen fluoride separated in the separation zone is recycled for reaction with the ammonia in the second reaction zone.

39. (Original): A method according to Claim 18, wherein at least a portion of the hydrogen fluoride separated in the separation zone is collected in a byproduct stream.

Claims 40 through 49. (Withdrawn).